

INFORMED CONSENT FOR ANTENATAL SERUM SCREENING FOR DOWN SYNDROME

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SUMMARY

Objective: Respect for patients' autonomy is a principle issue in medical ethics. Patients' understanding of antenatal serum screening for Down syndrome upon informed consent has barely been assessed. Our objective was to evaluate pregnant women's perceived level of understanding of this serum screening.

Materials and Methods: Pregnant women between the 15th and 21st gestational week were randomized into control and experimental groups, and were asked to complete a questionnaire before and after genetic counseling provided by researchers. The primary endpoints were the perceived level of understanding of serum screening for Down syndrome and the autonomy of the decision making for this serum screening. The secondary endpoints were the anxiety and depression levels of these women.

Results: Participants in the experimental group ($n=96$) had a significantly higher perceived level of understanding of antenatal serum screening for Down syndrome than participants in the control group ($n=97$). There were significantly more respondents in the experimental group making the decision themselves to undergo serum screening than women in the control group. Anxiety and depression levels were not significantly different between the women in the two groups.

Conclusion: Pregnant women should be offered more information to allow them to make an informed decision before they undergo antenatal serum screening for Down syndrome. Comprehensive genetic counseling improved pregnant women's autonomy in deciding whether to participate in serum screening. Health service providers should make effort to fulfill the ethical requirements of informed consent. [*Taiwan J Obstet Gynecol* 2010;49(1):50–56]

Key Words: antenatal serum screening, Down syndrome, informed consent, medical ethics

Introduction

Respect for autonomy and improving patients' understanding of the issues of early detection is one of the most important principles in medical ethics [1]. Patients should be provided with explicit information before undergoing screening tests, because patients intending to undergo screening must first weigh the potential benefits of screening against the potential risks. It is crucial that

they are enabled to make informed decisions based on relevant knowledge, consistent with their own values and their behavioral inclinations [2,3]. This is particularly true in the situation of antenatal screening for fetal chromosomal abnormalities given the possible consequences of invasive diagnostic procedures and possible termination of affected pregnancies.

The focus of the present study was on patient understanding of prenatal serum screening for Down syndrome upon informed consent. Currently, the second-trimester antenatal serum screening is the most widely used screening strategy, with a sensitivity of 50–76%, at a 5% false-positive rate [4–6]. Women with a risk of 1/270 or greater are designated screen-positive and will be suggested to undertake amniocentesis for prenatal diagnosis in Taiwan. Antenatal serum screening test fees for



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Down syndrome and amniocentesis are paid by the pregnant women themselves in this country. This screening test has been taken as a part of regular prenatal routine tests in many obstetric clinical settings and has achieved a high participation rate in Taiwan. However, the high participation rate may not reflect a high level of informed choice [7,8]. The level of awareness of about serum screening and thus a woman's ability to make an informed choice about whether to participate has not been studied.

The anxiety and/or depression levels of patients before counseling, prenatal screening or prenatal diagnostic testing has been quantified [9–11]. Genetic counseling significantly reduced screen-positive women's anxiety level regardless of whether an amniocentesis was performed [10]. However, the effect of counseling before antenatal serum screening on anxiety or depression levels has barely been evaluated.

In this study, we aimed to assess the patients' perceived level of understanding of antenatal serum screening for Down syndrome to evaluate the status of informed consent in Taiwan. We also measured anxiety and depression levels before the screening test.

Materials and Methods

This study was conducted in a medical center in Taipei offering maternal serum screening with the triple test (based on maternal age and serum concentrations of α -fetoprotein, human chorionic gonadotropin, and unconjugated estriol) between 2002 and 2003. This test was suggested and explained to pregnant women by obstetricians at routine prenatal care during the 15th to 21st gestational week. A leaflet about the test was given during the visit. Women who desired the test would undergo an ultrasound scan and blood withdrawal for the test on the same day, after they had paid for the test and signed an informed consent form.

This was a prospective, descriptive study of the women after they had been offered the antenatal serum screening for Down syndrome and had signed the informed consent for the screening test, but before they had undergone blood withdrawal. Women eligible for the study comprised those who intended to undergo the prenatal serum test, were at 15–21 weeks' gestation, and had booked for the continuing prenatal care at this medical center. We excluded women with a previous history of children with chromosomal abnormalities or congenital malformation, and women who were not sufficiently fluent in Mandarin or Taiwanese.

Women who gave written informed consent to participate in this study were randomly assigned into either

the experimental group or the control group. Participants were asked to complete a questionnaire administered by a trained researcher. Questionnaires were completed before and after genetic counseling provided by the researcher in the control group and experimental group, respectively. The interview lasted 30 minutes on average, and the questionnaires contained questions pertaining to the women's perceived level of understanding of antenatal serum screening, their level of knowledge about the serum screening test, and anxiety as well as depression levels, in addition to questions concerning sociodemographic characteristics and obstetric history. Most questions were of the yes/no or multiple choice variety. For some items, women responded on a four-point scale. The genetic counseling offered by the researcher included information on: (1) the background age-related risks of having a fetus affected by Down syndrome, (2) the nature of Down syndrome and its related medical and social issues, (3) serum makers and the procedure of serum screening, (4) the meaning of the risk estimated by screening, (5) the cutoff risk of 1/270 at mid-trimester, (6) the percentage of false-positives, (7) the follow-up action for screen-positive (usually amniocentesis) and screen-negative cases (no action), (8) the amniocentesis-related hazards, (9) the limitations of serum screening tests in detecting affected fetuses, and (10) a quoted sensitivity of 60% for mid-trimester screening tests [12].

The primary endpoints were the perceived level of understanding of relevant information about antenatal serum screening, knowledge about Down syndrome and serum screening, the source of their knowledge, and attitudes toward this screening test, including the reasons for undergoing the test. To assess knowledge about serum tests and the autonomy of the decision to take the test, the questionnaire used multiple choice questions modified from previous reports [13–16].

Secondary endpoints were the anxiety and depression levels of these pregnant women. Anxiety levels were evaluated by the short form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI), which consisted of a 20-item state anxiety scale designed for assessing the transient situation-related stress level [17]. Patients were asked to rate each item on a scale of 1 to 4. The scores obtained on the STAI can range from 20 to 80. A higher score means a greater level of anxiety in the patient. The STAI has been translated into Chinese and has been validated [18,19]. Scores were prorated to be equivalent to those obtained using the full form of the scale. The mean norm of anxiety levels in the general population samples of women is 36.85 [20]. To assess generalized depression, we used the Taiwanese Depression Questionnaire (TDQ), as it is short but sufficiently sensitive for the detection of clinically worthwhile

differences [21,22]. The TDQ is an 18-item, self-report scale assessing common symptoms of depression. Each item is assessed on a four-point scale (from 0 to 3), and the total scores may range from 0 to 54. It has a sensitivity of 0.89 and a specificity of 0.92 at a cutoff score of 19 [21,22]. The area under the receiver operating characteristics curves of the TDQ was 0.92, and the reliability of internal consistency (Cronbach α coefficient) was 0.90, which was quite satisfactory.

Statistical analyses

Categorical data were analyzed using the χ^2 test. Continuous data were analyzed using the Student's t test for normally distributed variables and the Mann-Whitney U test when distributions were skewed. All statistical analyses were conducted using SPSS 10.0 computer software (Statistical Package for Social Sciences, Inc., Chicago, IL, USA). A two-tailed $p < 0.05$ was considered statistically significant.

Results

Among the 220 approached women, 193 women (87.7%) agreed to participate in this study and completed the questionnaires. Women allocated to the experimental group (96 women) and those in the control group (97 women) were similar in their sociodemographic characteristics and obstetric background, with no statistically significant differences between the two groups (Table 1).

Table 2 presents the perceived level of understanding of the nature of Down syndrome and the level of understanding of informed consent about prenatal serum screening in both groups. Participants in the experimental group had statistically significantly higher perceived levels of understanding of the disease nature of Down syndrome and aspects of the antenatal screening test than the participants in the control group (Table 2). The overall level of knowledge about Down syndrome

Table 1. Sociodemographic and obstetric characteristics among patients in the experimental and control groups*

Items	Experimental ($n=96$)	Control ($n=97$)	p
Age, mean \pm SD (yr)	30.8 \pm 3.1	31.1 \pm 3.5	0.63
Gestational week, mean \pm SD (wk)	16.4 \pm 1.4	16.2 \pm 1.1	0.28
Education			
Senior high school or below	27 (28.1)	22 (22.7)	0.41
College or above	69 (71.9)	75 (77.3)	
Marital status			
Married	93 (96.9)	95 (97.9)	0.68
Unmarried	3 (3.1)	2 (2.1)	
Parity			
Nullipara	62 (64.6)	64 (66.0)	0.88
Multipara	34 (35.4)	33 (34.0)	
Religion			
Christian	13 (13.5)	10 (10.3)	0.22
Buddhism	46 (47.9)	53 (54.6)	
Taoism	14 (14.6)	16 (16.5)	
Others	23 (24.0)	15 (15.5)	
Previous experience of serum screening			
No	73 (76.0)	73 (75.3)	>0.99
Yes	23 (24.0)	24 (24.7)	
Previous experience of amniocentesis			
No	93 (96.9)	95 (97.9)	0.68
Yes	3 (3.1)	2 (2.1)	
Monthly family income			
\leq NT\$49,999	16 (16.7)	17 (17.5)	0.76
NT\$50,000–99,999	57 (59.4)	61 (62.9)	
\geq NT\$100,000	23 (24.0)	19 (19.6)	

*Data are presented as n (%).

and the screening test of respondents in the experimental group were higher than those of participants in the control group (Table 3). Fifty-one percent of respondents in the experimental group made the decision themselves to undergo serum screening, whereas only 36.1% of women in the control group made the decision themselves ($p=0.03$). The majority of participants (74.0% of women in the experimental group and 60.8% of women in the control group) would undergo amniocentesis when they were informed of a screen-positive result; there was no significant difference between these two groups. About half the respondents in the experimental group (50.0%) and in the control group (46.4%) stated that the serum screening would be taken as an index and would help them to make a well-informed decision about whether to have amniocentesis or not.

The STAI scores did not differ between the experimental group and the control group (44.3 ± 6.1 vs. 43.0 ± 5.7 ; $p=0.14$). No statistically significant differences between the experimental group and the control group were observed in the scores of the TDQ for depressive symptoms (12.2 ± 8.8 vs. 12.6 ± 7.5 ; $p=0.75$).

Discussion

Clinical guidelines for physicians on obtaining informed consent indicate that patients have the right to be informed about their condition and the treatment options available to them [1]. In addition to a professional recommendation, health care providers should give a

Table 2. Perceived level of understanding about Down syndrome and antenatal serum screening among patients in the experimental and control groups*

Items	Experimental ($n=96$)	Control ($n=97$)	p
Understanding of the nature of Down syndrome			
Quite well	49 (51.0)	19 (19.6)	<0.001
Somewhat	44 (45.8)	62 (63.9)	
Barely or not at all	3 (3.1)	16 (16.5)	
Understanding of the reason for serum screening			
Quite well	68 (70.8)	45 (46.4)	0.001
Somewhat	27 (28.1)	43 (44.3)	
Barely or not at all	1 (1.0)	9 (9.3)	
Understanding of the method of serum screening			
Quite well	50 (52.1)	34 (35.1)	<0.001
Somewhat	45 (46.9)	39 (40.2)	
Barely or not at all	1 (1.0)	24 (24.7)	
Understanding of biomarkers being used for screening			
Quite well	43 (44.8)	20 (20.6)	<0.001
Somewhat	50 (52.1)	39 (40.2)	
Barely or not at all	3 (3.1)	38 (39.2)	
Understanding of the meaning of the results of serum screening			
Quite well	48 (50.0)	15 (15.5)	<0.001
Somewhat	44 (45.8)	22 (22.7)	
Barely or not at all	4 (4.2)	60 (61.9)	
Understanding of the content of informed consent			
Quite well	65 (67.7)	38 (39.2)	<0.001
Somewhat	31 (32.3)	44 (45.4)	
Barely or not at all	0 (0)	15 (15.5)	
Enough time to understand the informed consent before making a decision			
Quite enough	52 (54.2)	34 (35.1)	0.002
Somewhat	41 (42.7)	48 (49.5)	
Barely or not at all	3 (3.1)	15 (15.5)	

*Data are presented as n (%).

Table 3. Level of knowledge about Down syndrome and antenatal serum screening among patients in the experimental group and control group*

Items	Experimental (n=96)	Control (n=97)	p
Knowledge level about the nature of Down syndrome			
Correct	47 (49.0)	34 (35.1)	0.06
Incorrect	49 (51.0)	63 (64.9)	
Knowledge about the methods for fetal Down syndrome detection			
Correct	23 (24.0)	26 (26.8)	0.54
Incorrect	73 (76.0)	70 (72.2)	
Knowledge about the time period for serum screening			
Correct	91 (94.8)	92 (94.8)	0.99
Incorrect	5 (5.2)	5 (5.2)	
Knowledge about the detection rate of mid-trimester serum screening			
Correct	84 (87.5)	77 (79.4)	0.14
Incorrect	11 (11.5)	20 (20.6)	
Knowledge about reasons for the incorrect estimation of risk			
Correct	50 (52.1)	43 (44.3)	0.24
Incorrect	46 (47.9)	52 (53.6)	
Knowledge about the meaning of screening-positive			
Correct	95 (99.0)	88 (90.7)	0.04
Incorrect	1 (1.0)	8 (8.2)	
Knowledge about the meaning of screening-negative			
Correct	77 (80.2)	75 (77.3)	0.80
Incorrect	18 (18.8)	20 (20.6)	
Total items			
Correct	467 (69.7)	435 (64.6)	0.048
Incorrect	203 (30.3)	238 (35.4)	

*Data are presented as n (%).

balanced view of the options to patients, in words they can understand, and give them enough time to consider the options. Pregnant women offered screening tests have the privilege of making judgments on their own behalf and evaluating the risks and benefits of the screening program [23,24]. Therefore, the degree to which women are adequately informed about antenatal serum screening should be of interest. Comprehensive counseling on maternal serum screening should be provided by health service professionals. This information can help patients improve their knowledge of the nature of the disease and test, encourage realistic expectations of the possible benefits and hazards of the options, increase patients' involvement in decision making, and reduce those patients' decisional conflicts that grow out of a feeling of being incompletely informed [2,3,25].

In this study, comprehensive genetic counseling about serum screening for Down syndrome helped pregnant

women to make their own decision whether to undergo the screening test. The results of this study indicate that women's perceived level of understanding of the antenatal serum screening test and level of knowledge about this test are significantly higher when genetic counseling is individually provided by a trained counselor separately than when a short description accompanied by a leaflet was offered by the obstetrician at a routine visit. The difference cannot be explained by age, religion, parity, previous experience with an antenatal serum test, or the socioeconomic status of the study population. In spite of the high uptake rates of serum screening in this medical center, the perceived level of understanding of this test was relatively low in the control group. A short explanation by obstetricians with a leaflet does not lead to the patients' full understanding of the screening test, even though patients did sign their informed consent forms for the test. The success of a

screening program should be assessed on the basis of the proportion of patients who can reach a truly informed decision, rather than on the attendance rates [26,27].

With the use of the STAI and TDQ, we quantified the levels of anxiety and depression of the women before antenatal serum screening and the effect that comprehensive genetic counseling can have on these levels. The state anxiety scores and depression levels did not differ between the two groups. Our study failed to demonstrate any effect of genetic counseling on anxiety or depression in women participating in antenatal serum screening. Furthermore, the study indicates that anxiety and depression were neither alleviated nor exacerbated by counseling before the test results were revealed. These results differed from previous reports of screen-positive women where anxiety level was reduced after genetic counseling. In these studies, anxiety level was elevated in screen-positive women, only to be alleviated once counseling revealed the possibility of a false-positive result [10,28].

In conclusion, women are not given enough information to allow them to make an informed decision about receiving antenatal serum screening for Down syndrome when the test is offered during the routine clinical visit with a short description accompanied by a leaflet. A trained counselor providing pregnant women with counseling about this screening test significantly improves the patients' knowledge about the test, and obviously encourages the patients' informed choice. Health service providers should do their best to meet the ethical requirements of informed consent for antenatal serum screening.

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